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A New Species of the *Copidognathus tricorneatus* Group (Acari: Halacaridae) from Western Australia with a Review of this Species-group

Ilse Bartsch

Biologische Anstalt Helgoland, Notkestraße 31, 22607 Hamburg, Germany

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A new species, *Copidognathus dictyotus*, is described and illustrated. The species is the second Australian member of the *tricorneatus* species-group. Other records of this group are from the northeastern Pacific (Aleutians), western North Atlantic, Caribbean Sea, eastern North Atlantic, Mediterranean Sea and Black Sea. The species in this species-group are diagnosed and a key to all eight species is given.

Key Words: Western Australia, Halacaridae, *Copidognathus*, new species, description, species-group, dichotomous key.

Introduction

With approximately 300 species, the cosmopolitan genus *Copidognathus* comprises about one-third of the Halacaroidea. The genus is characterized by the following combination of features: Anterior dorsal plate, ocular plates, and posterior dorsal plate present. Six pairs of idiosomatic setae; the sixth pair, the adanal setae, being on the anal cone. Anterior epimeral plate with pair of epimeral pores. Female in general with 3 pairs of perigenital setae and 1 pair of subgenital setae. Male genitoanal plate with 4 or more pairs of perigenital setae and 3-4 (rarely 2) pairs of subgenital setae. Palps 4-segmented; third segment without seta; fourth segment with 3 basal setae and an apical setula plus two spurs. Tibiae I to IV with 3, 3, 2, 2 ventral setae. Tarsi I to IV with 3, 0, 0, 0 ventral setae. Tip of each tarsus with pair of parambulacral setae. Solenidion on both tarsus I and II dorsolateral in position. One larval and one nymphal stage present during ontogenetic development.

Within this genus, several groups of related species have been recognized. One of these species-groups is the *tricorneatus*-group, named after *Copidognathus tricorneatus* (Viets, 1938). Representatives have been recorded from the Atlantic and Pacific Ocean and adjacent basins. The present paper reports a record from the Indian Ocean, in Western Australia.

Material and Methods

Sublittoral substrata of Rottnest Island, off Perth, Western Australia, were studied with regard to their halacarid fauna. The following description is based on dissected specimens that were cleared in lactic acid, rinsed in glycerine, and mounted in glycerine jelly.

The holotype and paratype will be deposited in the Western Australian Museum, Perth (WAM), the other two specimens in the Zoological Collection of the Graduate School of Science, Hokkaido University, Sapporo (ZIHU), and in the author's halacarid collection.

Abbreviations used in the descriptions: AD, anterior dorsal plate; AE, anterior epimeral plate; ds, dorsal setae on the idiosoma, ds-1 to ds-6, first to sixth pairs of dorsal setae; GA, genitoanal plate; GO, genital opening; OC, ocular plate(s); P, palp, P-1 to P-4, first to fourth palpal segment; pas, parambulacral seta(e); PD, posterior dorsal plate; PE, posterior epimeral plate; pgs, perigenital setae; sgs, subgenital setae. Legs are numbered I to IV, leg segments 1 to 6, I-6, tarsus on leg I.

Only the most relevant papers with a description of the species are listed in the synonymies.

Copidognathus dictyotus sp. nov.
(Figs 1-3)

Material examined. Holotype male (WAM), Western Australia, Rottnest Island, Roe Reef, corals, algae, and sponges, 30 m depth, 10 January 1991. Paratype female (WAM), collecting data same as for holotype.

One male (ZIHU), Duck Rock, macroalgae haptera and sponges, 7-10 m depth, 9 January 1991. One male, author's collection, collecting data same as above.

Description. *Male*. Idiosoma 205-255 μm long, that of holotype 245 μm long, 163 μm wide. Major parts of AD, OC, and PD uniformly reticulated, mesh size 3-4 μm (Fig. 1A). Coarse reticulation of marginal portions of PE with mesh size of 3-5 μm. AD trapezoidal, 46 μm long, 60 μm wide, with abruptly raised Y-shaped pattern and pair of gland pores in anterior corners of the 'Y' (Fig. 1B). OC slender, 59 μm long, 22 μm wide; reaching backwards almost to level of insertion of leg III. Anterolateral raised area with large anterior and two-lensed posterior cornea, and a gland pore; a pore canaliculus present immediately posterior to gland pore. PD 194 μm long, 98 μm wide; extending anteriad beyond anterior margin of OC. PD with two pairs of abruptly raised costae that are 2-3 μm wide. Surface of costae smooth; when focused on deeper integumental layers, few scattered canaliculi visible. Pair of distinct pores in posterior PD immediately lateral to medial pair of costae. Anal cone in the slightly compressed holotype covered by PD; in other specimens cone extending beyond PD. Dorsal idiosomatic setae short, slender; setae ds-1 close together in posterior portion of AD; ds-2 within membraneous integument between AD and OC; ds-3 to ds-5 on PD, with ds-3 near lateral margins of this plate, ds-4 and ds-5 lateral to pair of medial costae; ds-6 on anal plate.

AE and GA with distinctly demarcated, minutely reticulated (porose) panels (Figs 1C and D); mesh size within these panels 1 μm; each mesh with minute canaliculus. Integument outside porose areolae either smooth or faintly reticulated. AE 93 μm long, 126 μm wide; reticulated (porose) median areola almost 25 μm long and 20 μm wide. Epimeral processes triangular, narrow. Pair of epimeral pores with 5 μm long slit and cavity 5 μm in diameter. Three pairs of slender, 25 μm long, ventral setae. PE with marginal lamella. Integument between insertion of legs III and IV reticulated. GA 113 μm long, 85 μm wide; minutely reticulated areola rectangular, 58 μm long, 43 μm wide. GO 33 μm long; 24-26 pgs placed in ring around GO. Genital

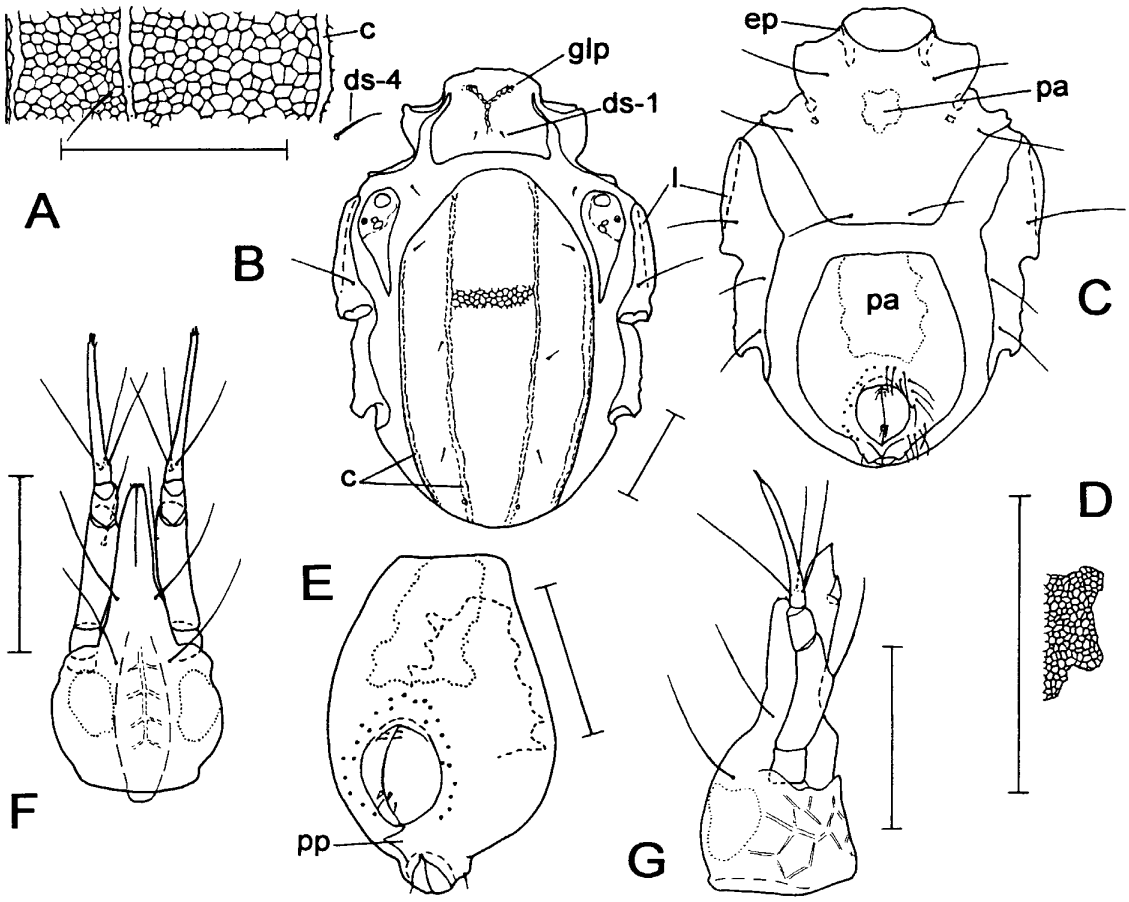

Fig. 1 *Copidognathus dictyotus* sp. nov., male. A, portion of PD level with ds-4; B, idiosoma, dorsal; C, idiosoma, ventral; D, minutely reticulate areola of AE; E, genitoanal plate; F, gnathosoma, ventral; G, gnathosoma, lateral (c, costa; ds-1, ds-4, first and fourth dorsal idiosomatic setae; ep, epimeral process; glp, gland pore; l, lamella; pa, minutely reticulate area; pp, postgenital papilla) Scales = 50 μm.

sclerites each with 4 sgs. Postgenital papilla posterior to GO lamellar (Fig. 1E).

Gnathosoma 90 μm long; rostrum slender, triangular, slightly longer than gnathosomal base. Pair of ovate, minutely reticulated (porose) areolae flanking pharyngeal field (Figs 1F and G). Rostral sulcus not reaching to apical pair of maxillary setae. Maxillary setae long; basal pair of setae on gnathosomal base, succeeding pair on rostrum. Apex of rostrum with two pairs of small, almost spur-like rostral setae. Rostrum extending to end of P-3. Distance from long dorsal seta to tip of P-2 more than this segment's width. P-4 longer than P-2, with three setae in basal whorl.

Legs slender, leg I much longer than idiosoma; legs II to IV (without claws) approximately as long as idiosoma. Telofemora, genua, and tibiae with short articular lamellae; tarsi with slender membranes of claw fossae. Telofemora I to IV 3.7, 2.7, 2.6, and 2.5 times longer than high. Tibiae I to IV 1.1, 1.1, 1.3, and 1.2 times longer than telofemora. Tarsus I shorter than tibia I; tarsus II (without claws) as long as tibia II; tarsi III and IV longer than tibiae. Setae long; their number, from trochanter to tarsus

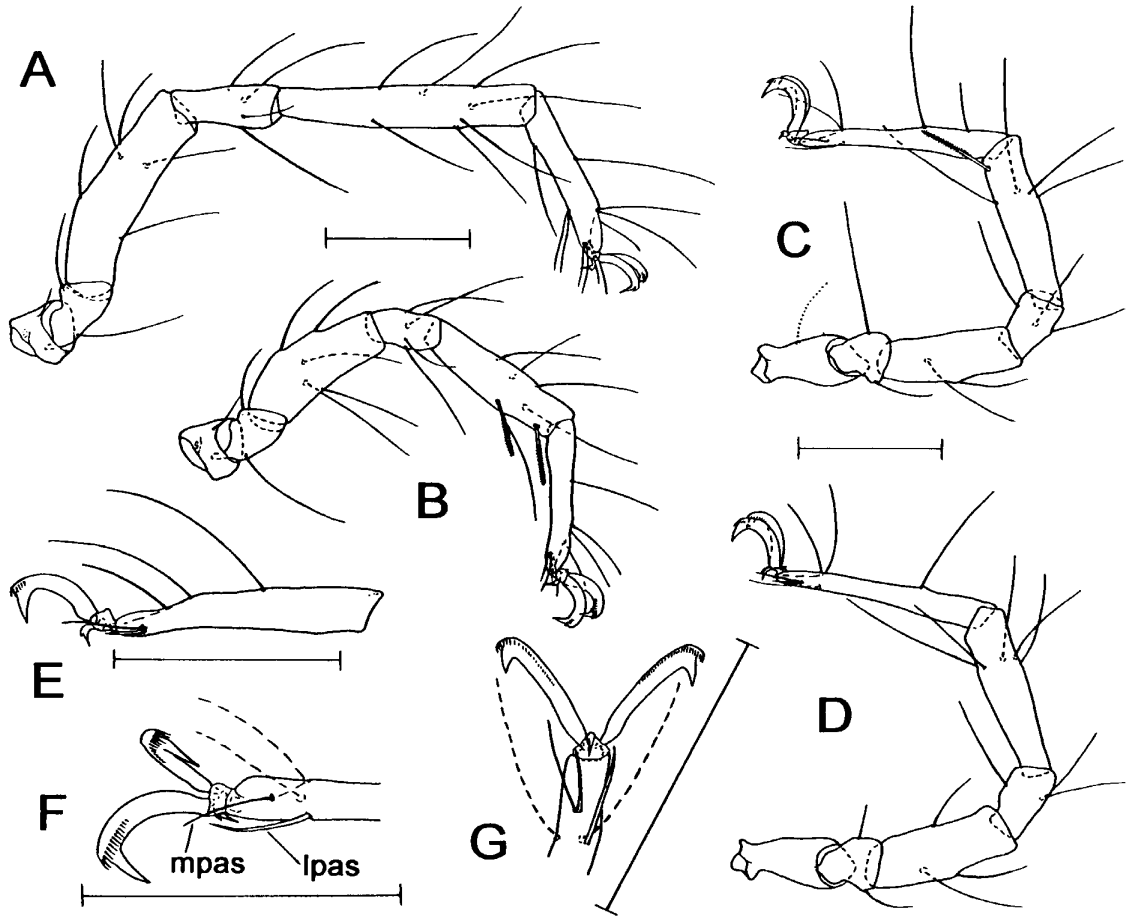

Fig. 2 *Copidognathus dictyotus* sp. nov., male. A, leg I, medial; B, leg II, medial; C, leg III, medial (dotted line: seta in holotype not seen, in other specimens present); D, leg IV, medial; E, tarsus II, lateral (medial setae and claw omitted); F, tarsus III, ventromedial (dorsal setae drawn in broken line); G, tarsus IV, ventral (dorsal setae drawn in broken line) (lpas, lateral parambulacral seta; mpas, medial parambulacral seta). Scales = 50 μm.

(parambulacral setae and solenidia included): leg I, 1, 2, 5, 4, 7, 11; leg II, 1, 2, 5, 4, 7, 8; leg III, (0-)1, 2, 2, 3, 5, 6; leg IV, 0, 2, 3, 3, 5, 6. In holotype no seta seen on trochanter III; in other males this seta present. Three ventral setae on tibia I slender, tapering (Fig. 2A). Tibiae II with 2 bluntly ending, delicately bipectinate ventromedial setae and one tapering, slender ventral seta (Fig. 2B). Ventromedial seta of tibia III short, bipectinate, ventral seta slender, tapering (Fig. 2C). Setae of tibia IV slender and tapering, ventromedial one distinctly shorter than ventrolateral one (Fig. 2D). Tarsi I to IV each with pair of fossary setae; both setae adjacent within proximal end of claw fossa. Tarsi I and II each with pair of doubled pas; the two setae on tarsus I long and eupathid (as in female, Fig. 3D); dorsal one of doubled setae on tarsus II long and eupathid, ventral one short and bristle-like (Fig. 2E). Apex of tarsus III with slender medial seta and wide lateral one, the latter inserted at same level as pair of fossary setae (Fig. 2F). Tip of tarsus IV with similar wide lateral pas; medially with doubled pas, viz., a slender dorsal and a shorter, bristle-shaped ventral seta (Fig. 2G).

Paired claws on tarsus I more slender than those of succeeding tarsi. Claw pecten

J-shaped, with delicate tines. Median sclerite with claw-shaped, bidentate process; lower tooth longer than upper one.

Female. Idiosoma 278 μm long. Dorsal plates similar to those of males. AD 52 μm long, 62 μm wide, OC 63 μm long, 28 μm wide (Fig. 3A), and PD 217 μm long, 100 μm wide. Minutely reticulated (porose) areola of AE 80 μm long, 30 μm wide (Fig. 3B), much longer than in males. GA 115 μm long, 87 μm wide; its anterior margin broadly rounded. Outline of minutely reticulated areola 70 μm long, 50 μm wide; integument smooth immediately around the anterior pair of setae. GO in posterior portion of GA. GA with 2 pairs of perigenital setae anterior to GO and 1 pair lateral to GO. Genital sclerites each with delicate seta near anterior margin. Ovipositor extending beyond anterior pair of pgs but not to anterior margin of GA. Gnathosoma and palps (Fig. 3C) as in males.

Remarks. *Copidognathus dictyotus* is closely related to *C. tricorneatus*, a species collected on the coast of eastern Australia, off Sydney. According to a slide bearing *C. tricorneatus* (housed in the Zoological Museum in Hamburg) and the description of that species by Viets (1938), the specimens from the eastern and western coast of Australia are not conspecific. The idiosoma of the somewhat compressed female of *C. tricorneatus*, with wide areas of membraneous integument between the plates, is 390 μm long. The PD is 217 μm long, 92 μm wide; its reticulation has a mesh size of 6-8 μm; in *C. dictyotus* the mesh size is 3-4 μm. The ovipositor of *C. tricorneatus* extends beyond the anterior margin of the GA, but that of *C. dictyotus* does not reach that margin. The rostrum of *C. tricorneatus* extends to the end of P-2, that of *C. dictyotus* to the end of P-3. Leg I of *C. tricorneatus* is shorter than the idiosoma; the telofemora I to IV are 2.9, 2.3, 2.2, and 2.3 times longer than high, and the tibiae are 1.1-1.2 times longer than the telofemora.

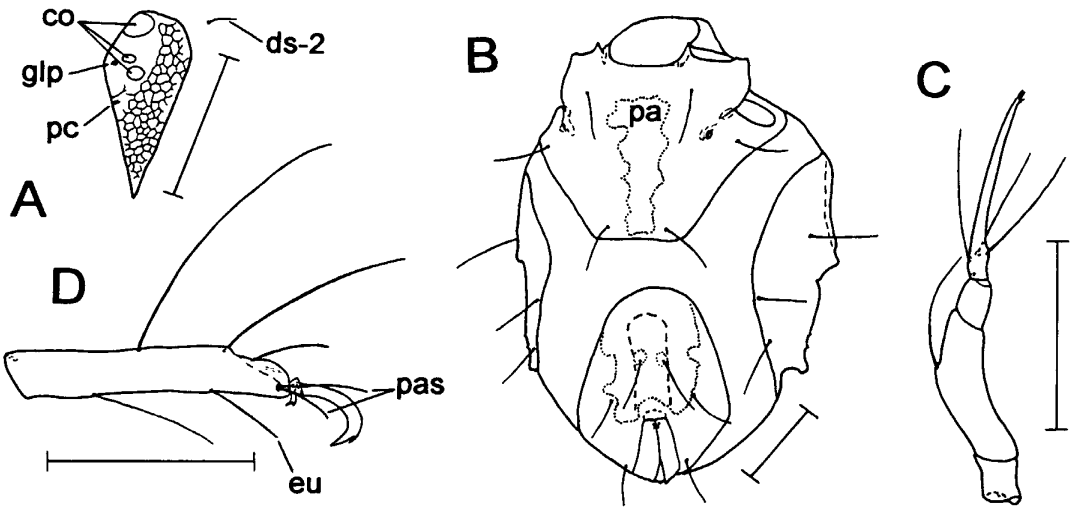

Fig. 3. *Copidognathus dictyotus* sp. nov., female. A, ocular plate; B, idiosoma, ventral; C, palp, lateral; D, tarsus I, lateral (medial setae and claw omitted) (co, corneae; ds-2, second dorsal seta; eu, eupathid seta; glp, gland pore; pa, minutely reticulate area; pas, parambulacral setae; pc, pore canaliculus). Scales = 50 μm.

The *tricorneatus* species-group

Copidognathus tricorneatus and *C. dictyotus*, as well as *C. hummelincki* (Viets, 1936), *C. kagamili* Newell, 1950, *C. longipes* Bartsch, 1973, *C. mucronatus* Viets, 1928, *C. quadricostatus* (Trouessart, 1894), and *C. trouessarti* (Voinov, 1896), belong to a natural species-group, the *tricorneatus*-group. Members of this group are characterized by the following combination of features: Dorsal plates reticulated. AD trapezoidal in outline; setae ds-1 standing close together in posterior portion of AD; first pair of gland pores distinctly anterior to ds-1. OC longer than wide, posterior cornea often divided. PD almost twice as long as wide and with narrow, abruptly raised costae. Epimeral pores open via oblique slits. Spermatopositor and ovipositor long, extending distinctly beyond genital opening. Males generally with postgenital papilla. Legs long, slender. Leg chaetotaxy, from trochanter to tibia: leg I, 1, 2, 5, 4, 7; leg II, 1, 2, 5, 4, 7; leg III, 1, 2, 2, 3, 5; leg IV, 0, 2, 3, 3, 5. Both ventral setae on tibia IV slender, tapering.

Diagnoses and Notes on the Species

Copidognathus dictyotus sp. nov.

Diagnosis. Idiosoma 205-280 μm long. Setae ds-2 within striated integument. Medial costae extending to anterior margin of PD. Costae smooth; rosette pores lacking. Setae ds-5 lateral to costae. No pair of gland pores level with insertion of legs IV. AE with median, minutely reticulated (porose) areola. Anterior margin of female GA broadly rounded, that of male GA truncate. Both female and male GA with median porose areola being rectangular in outline; areola in GA of female extending posteriad beyond middle pair of pgs; porose areola of male not reaching ring of pgs. Ovipositor extending beyond anterior pair of pgs but not to anterior margin of GA. Male GO surrounded by 24-26 pgs. Postgenital papilla lamella-shaped. Rostrum triangular, slender, extending to end of P-3. Apical pair of maxillary setae within basal half of rostrum; rostral sulcus not reaching this pair of setae. Tarsi III and IV with 4 and 3 dorsal setae respectively. Lateral pas on tarsi III and IV conspicuously wide and moved proximad to level with pair of dorsal fossary setae.

Distribution. Western Australia.

Copidognathus hummelincki (Viets, 1936)

Copidognathides hummelincki Viets, 1936: 411-415, figs 36-40.
Copidognathus hummelincki: Newell 1947: 162-164, figs 257-267.

Diagnosis. Idiosoma 280-325 μm long. AD with two porose median areolae. Setae ds-2 on OC. Medial costae of PD reaching beyond ds-3 but not to anterior margin of PD; costae with single line of rosette pores. Meshes of reticulum not subdivided. Setae ds-5 medial to costae. Pair of gland pores placed immediately lateral to costae, at level of insertion of leg IV. Except for small median areas, AE and GA roughly panelled, each panel uniformly porose. Both female and male GA with truncate anterior

margin. Ovipositor long, extending beyond anterior pair of pgs but not to anterior margin of GA. Male GA with 13 pairs of pgs. In the type material (housed in the Zoological Museum in Hamburg), postgenital papilla lacking. Rostrum slender, triangular, about as long as gnathosomal base and extending to end of P-2. Pair of maxillary setae inserted slightly apical to middle of rostrum; rostral sulcus extending almost to this pair of setae. Tarsi III and IV each with 4 dorsal setae; distance between the two basal setae less than the segment's height.

Remarks. *Copidognathus hummelincki* and *C. kagamili* are characterized by the presence of rosette pores within the costae of the PD. In contrast to *C. kagamili*, and the other species of the *tricorneatus*-group, *C. hummelincki* has the ds-5 medial to the costae.

Distribution. Western Atlantic and Caribbean Sea (Florida, Bonaire, Aruba). Intertidal (Viets 1936; Newell 1947).

Copidognathus kagamili Newell, 1950

Copidognathus kagamili Newell, 1950: 2-6, figs 1-12.

Diagnosis. Idiosoma 324-408 μm long. Setae ds-2 on OC; posterior cornea not subdivided. Medial costae of PD extending to anterior margin of plate; costae with single row of rosette pores. Setae ds-5 lateral to medial costae. Marginal areolae of AE and PE with rosette pores; GA with rosette pores on either side of genital opening. Anterior margin of female and male GA truncate. Ovipositor as well as spermatopositor extending beyond anterior pair of pgs but not to anterior margin of GA. Male GA with postgenital papilla and 13 pairs of pgs. Rostrum triangular, slightly shorter than gnathosomal base; rostrum extending to end of P-2. Rostral sulcus extending backwards just beyond level of apical pair of maxillary setae. Telofemora panelled.

Remarks. *Copidognathus kagamili* is most similar to *C. hummelincki* in having rosette pores within the costae of the PD. The former species has, in contrast to *C. hummelincki*, large areolae with rosette pores on the AE, PE, and GA, and the ds-5 are lateral to the costae.

Distribution. Northeastern Pacific, Aleutian Islands. Taken from boulders covered with corals, sponges, and hydrozoans from about 75 m depth (Newell 1950).

Copidognathus longipes Bartsch, 1973

Copidognathus longipes Bartsch, 1973a: 39-42, figs 3-14.
Copidognathus longipes: Bartsch 1973b: 52-53, figs 11-14.

Diagnosis. Idiosoma 350 μm long. AD with frontal spine, 25 μm long. Setae ds-2 within striated integument. PD with pair of gland pores level of insertion of leg IV; medial pair of costae extending anteriad slightly beyond level of ds-3 but not to anterior margin of plate. Medial costae with single line of small pores, but without rosette pores. Meshes of reticulum subdivided. Setae ds-5 lateral to costae. AE with transverse porose areola near posterior margin and two small porose areolae within

its epimera I. Anteriorly truncate female GA with porose areola extending as wedge between anterior pair of pgs. Ovipositor extending far beyond GO but not to anterior margin of GA. Rostrum slender, longer than gnathosomal base, reaching beyond end of P-2. Second pair of maxillary setae in basal half of rostrum; rostral sulcus almost extending to that pair of setae. Telofemora reticulated. Tarsi III and IV with 4 and 3 dorsal setae respectively; their lateral parambulacral seta inserted proximally to dorsal pair of fossary setae.

Remarks. *Copidognathus longipes* is characterized by its frontal spine. Another unique feature is the ventral position of the lateral parambulacral seta on tarsi III and IV.

Distribution. Northwestern Atlantic (Josephine Bank), taken from a depth of 210-240m (Bartsch 1973a, b).

Copidognathus mucronatus Viets, 1928

Copidognathus mucronatus Viets, 1928: 50-53, figs 4-7.
?*Copidognathus* (*Copidognathopsis*) *adriaticus*: Konnerth-Ionescu 1971: 92-94, pl. 2, figs 1-6.

Diagnosis. Idiosoma 335-400 μm (in the specimens housed in the Zoological Museum in Hamburg). Female with ds-3 in margin of PD; male with ds-3 on PD. Median pair of costae extending anteriad to level of ds-3. Meshes of reticulum between costae subdivided. Rosette pores lacking. Setae ds-5 lateral to medial costae. AE of male and female with pair of elongate porose areolae extending from anteriormost pair of ventral setae to posterior margin of AE. Anterior margin of female GA rounded; pair of ovate porose areolae about as long as GO; areolae reaching from level of anterior margin of GO beyond that of anterior pair of pgs; pair of areolae almost fused in midline. Anterior margin of male GA truncate; porose areola like an inverted U. GA with postgenital papilla and about 15-16 pairs of pgs; genital sclerites with 3 pairs of sgs. Rostrum triangular, shorter than gnathosomal base. Apical pair of maxillary setae inserted almost in middle of rostrum; rostral sulcus extending backwards to that pair of setae. Tibia III with bluntly ending, bipectinate ventromedial seta. Tarsus III with 4 dorsal setae; interval between the two basal setae same as height of that segment. Tarsus IV with 3 dorsal setae.

Remarks. *Copidognathus mucronatus* is most similar to *C. quadricostatus*. Females of *C. mucronatus* differ in that the anterior margin of the GA is ovate, not truncate, and the porose areolae are smaller than in *C. quadricostatus*. Males are distinguishable on the basis of the outline of the porose areolae. However, more material from the Black Sea may prove these characters to vary and *C. mucronatus* to be conspecific with *C. quadricostatus*.

Distribution. Black Sea (Viets 1928; Konnerth-Ionescu 1971). Taken from Phyllophora (Rhodophyta) (Viets 1928).

Copidognathus quadricostatus (Trouessart, 1894)

Halacarus gracilipes quadricostatus Trouessart, 1894: 171 (part.).

Copidognathus quadricostatus: Bartsch 1991: 1342-1345, figs 1-7.
Copidognathopsis adriatica Viets, 1940: 56-58, figs 91-95.
Copidognathus adriaticus: Bartsch 1980: Table 1; Morselli and Mari 1993: 117-119, figs 1 and 2.

Diagnosis. Idiosoma 270-345 μm long. Setae ds-2 within striated integument. Median pair of costae reaching slightly beyond level of ds-3. Rosette pores lacking. Meshes of reticulum not subdivided. Setae ds-5 lateral to medial costae. AE with U-shaped porose areola; porose areola extending anteriad to or slightly beyond level of pair of epimeral pores. Anterior margin of both female and male GA truncate. Rectangular porose areola of GA often with median pore-less spot. Porose areola in male reaching backwards to level of anteriormost pgs. Ovipositor extending almost to anterior margin of GA. Male with 12-15 pairs of pgs and a postgenital papilla. Rostrum triangular, almost as long as gnathosomal base; extending slightly beyond P-2. Apical pair of maxillary setae inserted slightly basally to middle of rostrum; rostral sulcus reaching backwards to level of this pair of setae. Tarsi III and IV with 4 and 3 dorsal setae respectively.

Remarks. *Copidognathus quadricostatus* is similar to *C. trouessarti* and *C. mucronatus,* but *C. trouessarti* has a much longer, slender rostrum, and the arrangement of the maxillary setae is different from the other species. *Copidognathus quadricostatus* and *C. mucronatus* can be discriminated on the basis of the outline of the porose areolae on the AE and GA.

On the basis of three females from the Adriatic Sea, Viets (1940) described a new species, *Copidognathopsis adriatica*. Purportedly diagnostic characters of the specimens are: Idiosoma 270-305 μm long. Setae ds-2 within membraneous integument. Medial costae in one specimen extending to ds-3, in another halfway between ds-3 and ds-4. Costae lacking rosette pores. Meshes of reticulum not subdivided. Setae ds-5 lateral to medial costae. AE with U-shaped porose areola extending anteriad beyond level of epimeral pores. Anterior portion of GA broadly rounded. Quadrangular porose areola with anteromedian pore-less spot, areola thus similar to a U; porose areola extending posteriad almost to level of second pair of perigenital setae. Ovipositor not reaching anterior margin of GA. Rostrum triangular, about as long as gnathosomal base, slightly surpassing P-2. Distal pair of maxillary setae in basal half of rostrum; rostral sulcus almost reaching that pair of setae. Ventromedial seta on tibia III blunt and bipectinate. Tarsus III with 4 dorsal setae; interval between the two basal ones equalling height of tarsus. Tarsus IV with 3 dorsal setae. Morselli and Mari (1993) presented a redescription. The differences between individuals of *Copidognathus quadricostatus* from the northeastern Atlantic and those identified as *C. adriaticus* from the Mediterranean are small. As long as new material from the Adriatic Sea and more knowledge of the influence of environmental parameters upon morphological characters (e.g., ornamentation of the plates) do not prove the opposite, the latter is regarded as a junior synonym of the former.

Distribution. Northeastern Atlantic and Mediterranean (Adriatic and Tyrrhenian Sea) (Trouessart 1894; Viets 1940; Bartsch 1979, 1980; Morselli and Mari 1993). The record from the Black Sea (Konnerth-Ionescu 1971) is in need of verification.

In the northeastern Atlantic, *Copidognathus quadricostatus* was generally found amongst sublittoral colonies of bryozoans, often together with *C. trouessarti* .

Copidognathus tricorneatus (Viets, 1938)

Copidognathopsis tricorneata Lohmann: Viets, 1938: 128-132, figs 1-10.

Diagnosis. Idiosoma 220-270 μm (according to Viets 1938) and 390 μm long (slide of somewhat compressed female, housed in the Zoological Museum, Hamburg). Setae ds-2 within striated integument. PD of compressed female 217 μm long, 92 μm wide; reticulation with a mesh size of 6-8 μm. Medial costae not reaching anterior margin of PD. Ovipositor extending well beyond anterior margin of GA (Viets 1938: fig. 4). Rostrum about as long as gnathosomal base, extending just beyond end of P-2.

Remarks. The description published by Viets (1938) is based on notes and figures prepared by Lohmann; the description is far from detailed. In contrast to *Copidognathus dictyotus*, a species from Western Australia, the legs and rostrum of *C. tricorneatus* are shorter; moreover, in *C. tricorneatus* the ovipositor extends beyond the GA.

Several specimens had suctorians (*Ophryodendron*) on the legs (Viets 1938).

Distribution. Eastern Australia; taken off Sydney from a substratum with corals and sponges.

Copidognathus trouessarti (Voinov, 1896)

Halacarus trouessarti Voinov, 1896: 128, 129; 1897: 94, 95, plate 1.
Copidognathus trouessarti: Bartsch 1991: 1345, 1346, figs 8-15.

Diagnosis. Idiosoma 320-435 μm long. Setae ds-2 within striated integument. Medial pair of costae extending slightly beyond ds-3 but not to anterior margin of PD. Costae without rosette pores. Meshes of reticulum subdivided. Major parts of AE porose (minutely reticulated); integument smooth within a transverse anteromedian area and pair of marginal areas posterior to insertion of leg II. Female GA anteriorly ovate, male GA broadly rounded to truncate. Anterior portion of female and male GA minutely reticulated; this ornamentation extending backwards beyond level of anterior margin of GO. Ovipositor extending to but not beyond anterior margin of GA. Male GA with 28-37 pgs and a postgenital papilla. Rostrum slender, longer than gnathosomal base and extending almost to end of P-3. Apical pair of maxillary setae inserted within basal quarter of rostrum; rostral sulcus far from reaching this pair of setae. Both ventral setae on tibia III slender, tapering. Tarsi III and IV in general each with 4 dorsal setae; distance between the two basalmost setae same as height of tarsi.

Remarks. *Copidognathus trouessarti* is separated from the Mediterranean and northern Atlantic representatives of the *tricorneatus* species-group on the basis of the elongate rostrum extending to the end of P-3 and the pair of tapering ventral setae on tibia III.

Distribution. Northeastern Atlantic Ocean and Mediterranean. Often found together with *Copidognathus quadricostatus* amongst sublittoral bryozoans and barnacles (Voinov 1896, 1897; Bartsch 1973a, b, 1979, 1991).

Key to the Species

1a. Anterior margin of AD rounded or truncate. 2
1b. AD with 25 μm long frontal spine. ..... *longipes*
2a. Medial costae of PD with rosette pores. 3
2b. PD without rosette pores. 4
3a. GA with rosette pores. Setae ds-5 lateral to medial costae. ..... *kagamili*
3b. GA uniformly porose. Setae ds-5 medial to medial costae. ..... *hummelincki*
4a. Rostrum triangular. Apical pair of maxillary setae in basal third or near middle of rostrum, distinctly beyond level of end of P-1. Rostral sulcus extending almost to this pair of setae. 5
4b. Rostrum parallel-sided. Apical pair of maxillary setae inserted in basal quarter of rostrum or level with end of P-1. Rostral sulcus far from reaching this pair of setae. ..... *trouessarti*
5a. Medial costae of PD not reaching anterior margin of PD. 6
5b. Medial costae of PD reaching anterior margin of PD. Rostrum slender, extending to end of P-3. ..... *dictyotus*
6a. Ovipositor not reaching anterior margin of GA. 7
6b. Ovipositor extending beyond anterior margin of GA. ..... *tricorneatus*
7a. AE with pair of oblong porose areolae extending to pair of anteriormost setae. GA of female with two ovate porose areolae not reaching anterior margin of plate. ..... *mucronatus*
7b. AE with U-shaped porose areola not reaching pair of anteriormost setae. Anterior portion of GA in female with rectangular porose areola. ..... *quadricostatus*

General Remarks

The *tricorneatus*-group is spread world-wide; records are from all oceans, from cold temperate to tropical waters, and from marine to brackish water basins.

There are records from the intertidal zone but the majority of species are expected to be found in sublittoral habitats. With their long legs, representatives of the *tricorneatus*-group will have no interstitial or burrowing mode of life but inhabit a very spacious substratum.

In *Copidognathus* in general, tarsi III and IV each have a pair of parambulacral setae which insert near the tip of the tarsi, distinctly distal to the level of the paired dorsal fossary setae; the parambulacral setae are short, slender, or spur-like. In contrast, in *C. dictyotus* the parambulacral setae are not paired; the unusually long and stout lateral parambulacral seta is situated proximally and inserts at the level of the paired dorsal setae; and in *C. longipes*, the lateral parambulacral seta is distinctly proximal to the pair of dorsal fossary setae (Bartsch 1973a: fig. 12, 1973b: fig. 14). An even more marked dislodgment of the parambulacral setae is described in *Arhodeoporus eclogarius* (André, 1959) and the other species of the *eclogarius*-group. Tarsi III and IV of representatives of this group each have a long ventral seta at the same level as the median dorsal seta. The species of the *A. eclogarius*-group demonstrate a striking resemblance to species of the *Copidognathus tricorneatus*-group. In both groups, the species are long-legged, the dorsal plates have the same reticulate pattern, the posterior cornea is subdivided, the PD has a pair of narrow medial costae,

and the ventral plates have demarcated porose areolae. Collection data of the members of these two groups are very sparse, so it is not known whether representatives of these two groups inhabit the same ecological niche.

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